WHAT IS CLAIMED IS:

1. A transformer inrush current elimination system for suppressing an inrush current that is generated as a transition current when a three-phase transformer is connected to a three-phase power supply via a three-phase circuit breaker, comprising:

source voltage measuring means adapted to measure a source voltage of any one phase to be used as a standard phase among three-phases;

transformer voltage measuring means adapted to measure a transformer voltage of each of the three-phases;

a residual flux calculating portion adapted to calculate a residual flux of each phase using the transformer voltage of each phase measured by said transformer voltage measuring means before and after a opening command input time;

a closing order determining portion adapted to determine a phase having the greatest absolute value of the residual flux calculated by the residual flux calculating portion, to be a first closing phase among the three-phases;

a target closing phase determining portion adapted to determine target closing phases of the three closing phases,

wherein, regarding the first closing phase, said target closing phase determining portion calculates a

closing phase having the smallest value of an energization flux error that is an absolute value of the maximum error between a constant flux value and a residual flux value at a connection input point, based upon the residual flux of the first closing phase, and a preliminarily given pre-arc characteristic and closing time deviation characteristic of the three-phase circuit breaker, by using a 0 degree phase of the standard phase as a reference point, and sets the resultant calculated closing phase to be a target closing phase of the first closing phase, and

wherein, regarding the rest two phases, said target closing phase determining portion calculates a closing phase having the smallest value of the energization flux error in the case of the residual flux being 0, based upon the preliminarily given pre-arc characteristic and closing time deviation characteristic of the three-phase circuit breaker, by using the 0 degree phase of the standard phase as a reference point, and sets the resultant calculated closing phase to be a target closing phase of each of the rest two phases;

a target closing time determining portion adapted to calculate a time required from the reference point to the target closing phase of the first closing phase so that the calculated time is determined to be a target closing time of the first closing phase, and calculate a sum of the time

required from the reference point to the target closing phases of the rest two phases and a delay time corresponding to an integral multiple of a predetermined cycle of the three-phase power supply so that the calculated sum is determined to be a target closing time of each of the rest two phases; and

a controlled closing portion which, upon receipt of a closing command, outputs a controlled closing signal to the three-phase circuit breaker so that each phase is contact-closed at the target closing time of each phase calculated by said target closing time determining portion, by using the 0 degree phase of the source voltage of the standard phase inputted from the source voltage measuring means as a reference point,

wherein said three-phase transformer has a primary winding having a star connection with a neutral ground and a secondary or tertiary winding having a triangle connection, and said three-phase circuit breaker connects the three-phase transformer to the three-phase power supply by the closing and disconnects the transformer from the three-phase power supply by the opening.

2. A transformer inrush current elimination system for suppressing an inrush current that is generated as a transition current when a three-phase transformer is

connected to a three-phase power supply via a three-phase circuit breaker, comprising:

source voltage measuring means adapted to measure a source voltage of any one phase to be used as a standard phase among three-phases;

transformer voltage measuring means adapted to measure a transformer voltage of the standard phase;

a controlled opening portion which, upon receipt of a opening command, simultaneously outputs controlled opening signals to the rest two phases other than the standard phase, and after a predetermined time lapse therefrom, which outputs a controlled opening signal to the standard phase;

a residual flux calculating portion adapted to calculate a residual flux of the standard phase using the transformer voltage of the standard phase measured by said transformer voltage measuring means before and after an opening command input time;

a target closing phase determining portion adapted to determine target closing phases of the three closing phases,

wherein, regarding the standard phase, said target closing phase determining portion calculates a closing phase having the smallest value of an energization flux error that is an absolute value of the maximum error between a constant flux value and a residual flux value at

a connection input point, based upon the residual flux of the standard phase, and a preliminarily given pre-arc characteristic and closing time deviation characteristic of the three-phase circuit breaker, by using a 0 degree phase of the standard phase as a reference point, and sets the resultant calculated closing phase to be a target closing phase of the standard phase, and

wherein, regarding the rest two phases, said target closing phase determining portion calculates a closing phase having the smallest value of the energization flux error in the case of the residual flux being 0, based upon the preliminarily given pre-arc characteristic and closing time deviation characteristic of the three-phase circuit breaker, by using the 0 degree phase of the standard phase as a reference point, and sets the resultant calculated closing phase to be a target closing phase of each of the rest two phases;

a target closing time determining portion adapted to calculate a time required from the reference point to the target closing phase of the standard phase so that the calculated time is determined to be a target closing time of the standard phase, and calculate a sum of the time required from the reference point to the target closing phases of the rest two phases and a delay time corresponding to an integral multiple of a predetermined

cycle of the three-phase power supply so that the calculated sum is determined to be a target closing time of each of the rest two phases; and

a controlled closing portion which, upon receipt of a closing command, outputs a controlled closing signal to the three-phase circuit breaker so that each phase is contact-closed at the target closing time of each phase calculated by said target closing time determining portion, by using the 0 degree phase of the source voltage of the standard phase inputted from the source voltage measuring means as a reference point,

wherein said three-phase transformer has a primary winding having a star connection with a neutral ground and a secondary or tertiary winding having a triangle connection, and said three-phase circuit breaker connects the three-phase transformer to the three-phase power supply by the closing and disconnects the transformer from the three-phase power supply by the opening.

3. A transformer inrush current elimination system for suppressing an inrush current that is generated as a transition current when a three-phase transformer is connected to a three-phase power supply via a three-phase circuit breaker, comprising:

source voltage measuring means adapted to measure a

source voltage of any one phase to be used as a standard phase among three-phases;

transformer voltage measuring means adapted to measure a transformer voltage of each of the three-phases;

a residual flux calculating portion adapted to calculate a residual flux of each phase using the transformer voltage of each phase measured by said transformer voltage measuring means before and after a opening command input time;

a closing order determining portion adapted to determine a closing order of the three-phases, wherein, regarding each of the three-phases, said closing order determining portion calculates a minimum energization flux error and a closing phase having the smallest value of the energization flux error that is an absolute value of the maximum error between a constant flux value and a residual flux value at a connection input point, based upon the calculated residual flux, and a preliminarily given pre-arc characteristic and closing time deviation characteristic of the three-phase circuit breaker, by using a 0 degree phase of the standard phase as a reference point, and sets the resultant calculated closing phase having the smallest minimum energization flux error to be a first closing phase among the three-phases;

a target closing phase determining portion adapted to

determine target closing phases of the three-phases,

wherein, regarding the first closing phase, said target closing phase determining portion calculates a closing phase having the smallest value of the energization flux error of the first closing phase calculated by said closing order determining portion, and sets the resultant calculated closing phase to be a target closing phase of the first closing phase, and

wherein, regarding the rest two phases, said target closing phase determining portion calculates a closing phase having the smallest value of the energization flux error in the case of the residual flux being 0, based upon the preliminarily given pre-arc characteristic and closing time deviation characteristic of the three-phase circuit breaker, by using the 0 degree phase of the standard phase as a reference point, and sets the resultant calculated closing phase to be a target closing phase of each of the rest two phases;

a target closing time determining portion adapted to calculate a time required from the reference point to the target closing phase of the first closing phase so that the calculated time is determined to be a target closing time of the first closing phase, and calculate a sum of the time required from the reference point to the target closing phases of the rest two phases and a delay time

corresponding to an integral multiple of a predetermined cycle of the three-phase power supply so that the calculated sum value is determined to be a target closing time of each of the rest two phases; and

a controlled closing portion which, upon receipt of a closing command, outputs a controlled closing signal to the three-phase circuit breaker so that each phase is contact-closed at the target closing time of each phase calculated by said target closing time determining portion, by using the 0 degree phase of the source voltage of the standard phase inputted from the source voltage measuring means as a reference point.

wherein said three-phase transformer has a primary winding having a star connection with a neutral ground and a secondary or tertiary winding having a triangle connection, and said three-phase circuit breaker connects the three-phase transformer to the three-phase power supply by the closing and disconnects the transformer from the three-phase power supply by the opening.

4. The transformer inrush current elimination system according to claim 1, further comprising:

main circuit current measuring means adapted to measure a main circuit current of each of the three-phases; and

a closing time calculating portion adapted to calculate a measured closing time required from a point of outputting a controlled closing signal of each phase to a point of the closing, by using a controlled closing signal of each phase outputted from the controlled closing portion, the main circuit current of each phase measured by said main circuit current measuring means and preliminarily given voltage resistant characteristics of each phase,

wherein said controlled closing portion corrects the controlled closing signal based upon the measured closing time.

5. The transformer inrush current elimination system according to claim 2, further comprising:

main circuit current measuring means adapted to measure a main circuit current of each of the three-phases; and

a closing time calculating portion adapted to calculate a measured closing time required from a point of outputting a controlled closing signal of each phase to a point of the closing, by using a controlled closing signal of each phase outputted from the controlled closing portion, the main circuit current of each phase measured by said main circuit current measuring means and preliminarily given voltage resistant characteristics of each phase,

wherein said controlled closing portion corrects the controlled closing signal based upon the measured closing time.

6. The transformer inrush current elimination system according to claim 3, further comprising:

main circuit current measuring means adapted to measure a main circuit current of each of the three-phases; and

a closing time calculating portion adapted to calculate a measured closing time required from a point of outputting a controlled closing signal of each phase to a point of the closing, by using a controlled closing signal of each phase outputted from the controlled closing portion, the main circuit current of each phase measured by said main circuit current measuring means and preliminarily given voltage resistant characteristics of each phase,

wherein said controlled closing portion corrects the controlled closing signal based upon the measured closing time.